REMARKS

In the Office Action, claims 1, 2, 5-16, 18 and 20 are rejected under 35 U.S.C. §103. In response the Office Action and in accordance with the Examiner interview courteously granted on October 12, 2005, claims 1, 5 and 16 have been amended herein. This Amendment is submitted with a Request for Continued Examination ("RCE"). A check in the amount of $790.00 is submitted herewith to cover the cost of the RCE. Please charge Deposit Account No. 02-1818 for any insufficiency or credit. Applicants believe that the rejections have been overcome and/or are improper in view of the amendments and for the reasons set forth below.

In the Office Action, claims 1, 2 and 10-15 are rejected under 35 U.S.C. §103(a) in view of Patent Abstracts of Japan Publication No. 11167036 to Kondo et al. ("*Kondo I*"); Patent Abstracts of Japan No. 07-063936 to Yoshimura ("*Yoshimura*"); and Kondo et al., Optic Letters Vol. 24, No. 10, pp. 646-648 ("*Kondo II*"). The Patent Office primarily relies on *Kondo I* and thus relies on the remaining cited art as provided in the Office Action to remedy the deficiencies of same.

Of the pending claims at issue, claims 1, 5 and 16 are the sole independent claims. Amended claims 1 recites a method for manufacturing a planar lightwave circuit type optical coupler/splitter that is provided with plural ports for performing light input and light output inside a cladding layer formed from a glass material, and in which a waveguide core is formed that optically connects said ports. The method includes the steps of: setting at least one portion between said ports as a refractive index adjustment area and forming portions of said waveguide core, *wherein the waveguide core is not formed in the refractive index adjustment area*; inputting signal light into one port and monitoring the signal light outputted from other ports; and adjusting optical characteristics of said optical coupler/splitter by forming the waveguide core in said refractive index adjustment area of said waveguide core by adjusting a refractive index of said refractive index adjustment area by focusing a laser beam onto said refractive index adjustment area during the monitoring.

According to the manufacturing method of claim 1, the optical characteristics of the optical coupler/splitter can be arbitrarily adjusted by varying the refractive index of the refractive index adjustment area, and an optical coupler/splitter having desirable optical characteristics can be obtained.

Amended claims 5 and 16 recite a method for manufacturing a planar lightwave circuit type optical coupler/splitter or to a method for adjusting optical characteristics of a planar lightwave circuit device. The methods include forming portions of said waveguide core, *wherein the waveguide core is not formed in a refractive index adjustment area*. These methods are characterized by scanning the refractive index adjustment area by shifting the focal point of a laser beam along the refractive index adjustment area repeatedly and by adjusting optical characteristics of these devices by changing the number of times of scanning.

According to the manufacturing methods of claims 5 and 16, the optical characteristics of the optical device can be adjusted in accordance with the number of times of scanning, and an optical device having desirable optical characteristics can therefore be obtained by changing the number of times of scanning.

In contrast, the emphasis of *Kondo I* is the fabrication of a lightwave circuit device by assembling a plurality of glass materials (21 to 24). Each of the glass materials has a waveguide core (21a to 24a), and the refractive index of the waveguide core (21a) of one glass material (21) is varied beforehand with those of other waveguide cores (22a to 24a) by focusing a laser beam onto the waveguide core. Further, *Yoshimura* discloses a fabrication of a lightwave circuit device (3) which is formed from a resin. The optical characteristics of the device are adjusted by partly varying the refractive index of the waveguide core by focusing an ultraviolet ray onto the waveguide core. Moreover, *Kondo II* discloses fabrication of a long-period optical fiber grating by focusing a femto-second laser. The long-period optical fiber grating is provided by varying the refractive index of a part of a core which is positioned in the center of a single mode optical fiber.

However, forming of a waveguide core having an area in which the waveguide core is not formed, and newly forming the refractive index adjustment area in this area by additionally focusing the laser beam, are not disclosed in the citations.

That is, in *Kondo I*, the refractive index of the waveguide core (21a) of the glass material (21) is determined prior to assembly of the lightwave circuit device. Furthermore, the additional focusing of the laser beam onto the waveguide core is not disclosed in *Kondo I*. Therefore, in *Kondo I*, the optical characteristics of the lightwave circuit device cannot be adjusted after the assembly of the glass materials.

In *Yoshimura* and *Kondo II*, the focusing of an ultraviolet ray or a laser beam is performed to adjust the refractive index of the waveguide core which is previously formed in the lightwave circuit device or the optical fiber. Furthermore, the radiation of the ultraviolet ray or laser beam in *Yoshimura* and *Kondo II* is not performed for obtaining a lightwave circuit device having arbitrary optical characteristics but for correcting an error in the refractive index of the waveguide core to the predetermined value, as described in the specification of *Yoshimura*.

Therefore, the features of the claimed invention in which the portions of the waveguide core other than the refractive index adjustment area are formed so as to avoid forming the waveguide core to the refractive index adjustment area, and then the refractive index adjustment area is formed by focusing the laser beam, at a minimum is not disclosed or suggested by the cited art.

Based on at least these reasons, Applicants believe that the cited art fails to disclose or suggest the claimed invention. Therefore, Applicants respectfully submit that the cited art, even is properly combinable fails to render obvious the claimed invention.

Accordingly, Applicants respectfully request that the obviousness rejection with respect to claims 1, 2 and 10-15 be withdrawn.

In the Office Action, claims 5-9, 16, 18 and 20 are rejected under 35 U.S.C. §103(a) in view of *Kondo I* and *Yoshimura* as applied to claim 1 above, and in further view of Miura, K. et al., "Photowritten optical waveguides in various glasses with ultrashort pulse lasers" Applied Physics Letter, Vol. 71, No. 23, December 8, 1997, pp. 3329-3331 ("*Miura*"). At the outset, Applicants believe that *Kondo I* and *Yoshimura* are distinguishable from the claimed invention based on at least substantially the same reasons as discussed above.

Further, Applicants do not believe that the Patent Office can rely solely on *Muira* to remedy the deficiencies of *Kondo I* and *Yoshimura*. *Muira* discloses formation of waveguide cores in various kinds of glass materials by focusing a laser beam which is selected from various kinds of laser beams. *Muira* does not disclose a waveguide core having an area corresponding to the refractive index adjustment area, and the additional focusing of the laser beam onto the waveguide core. Moreover, repeated scanning of the waveguide core by shifting the focal point of a laser beam, and adjusting the optical characteristics of the optical device by changing the number of times of scanning, are not disclosed in the citations. That is, an additional focusing of

the laser beam onto the waveguide core which is formed by focusing the laser beam is not disclosed in *Kondo I* and *Muira*. Furthermore, in *Yoshimura* and *Kondo II*, the additional focusing of the laser beam onto the waveguide core is not performed by repeated scanning of the laser beam but is performed by radiating the laser beam only once.

In addition, the relationship between the optical characteristics and the number of times of scanning of the laser beam is not disclosed or suggested in the cited art. In this regard, the features of the claimed invention in which the optical characteristics of the lightwave circuit device are adjusted by changing the number of times of scanning, at a minimum is not disclosed or suggested by the cited art.

In the Office Action, the Examiner asserted that *Miura* discloses the feature that the number of times of scanning is determined beforehand based on the relationship between the optical characteristics of the optical coupler/splitter and the number of times of scanning required to change same. However, in *Miura*, although the relationship between the material of a glass sample and wavelength of the radiated laser beam in the case of the formation of a waveguide core in a glass sample, is disclosed, the focusing of the laser beam is performed only once. Furthermore, *Miura* makes no mention of the repeated scanning of the laser beam.

Based on at least these reasons, Applicants believe that the cited art fails to render obvious the claimed invention.

Accordingly, Applicants respectfully request that the obviousness rejection with respect to claims 5-9 16, 18 and 20 be withdrawn.

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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Dated: November 9, 2005